CLAIMS

1. A material for producing a corrosion- and wear-resistant layer on a substrate by thermal spraying, which has at least 20% by weight, preferably more than 30% by weight, of magnetite (Fe_3O_4 and/or $FeFe_2O_4$).

2. A material as set forth in claim 1 characterised in that it comprises pure magnetite.

3. A material as set forth in claim 1 characterised in that it comprises magnetite and at least one further metallic material.

4. A material as set forth in claim 1 characterised in that it comprises magnetite and at least one intermetallic compound.

5. A material as set forth in claim 1 characterised by an addition of carbide or carbides or nitride or nitrides or silicide or silicides or boride or borides or oxide or oxides.

6. A material as set forth in claim 1 characterised by the addition of a mixture of metals, intermetallic compounds, carbides, nitrides, silicides, borides and/or oxides.

7. A material as set forth in claim 1 or claim 3 characterised by magnetite and an addition of up to 50% by weight, preferably up to 40% by weight, of Cr, CrNi or a ferritic steel.

8. A material as set forth in claim 1 or claim 5 characterised in that it comprises magnetite and carbides of W, Cr, Mo, Nb, Ta, Ti or V.

9. A material as set forth in claim 8 characterised in that it comprises magnetite with an addition of up to 30% by weight, preferably up to 20% by weight, of tungsten and/or chromium carbides.

10. A material as set forth in claim 1 or claim 5 characterised by a mixture of magnetite and chromium oxide.

11. A material as set forth in claim 10 characterised by a proportion of the chromium oxide of between 1 and 40% by weight and preferably between 5 and 30% by weight.

12. A material as set forth in one of claims 1 through 11 characterised by a grain size of the powder spray material of between 0.05 and 150 μm, preferably between 0.1 and 120 μm.

13. A material as set forth in one of claims 1 through 12 characterised by a filling wire in the form of wire spray material whose filling comprises magnetite and whose sheath comprises an alloy.

14. A material as set forth in one of claims 1 through 13 characterised by a powder grain with good flow properties, which is produced from the powder material mixture by spray drying.

15. A material as set forth in one of claims 1 through 3 characterised by a powder grain which is resistant to separation of its mixture and which is produced from the powder material mixture by means of an agglomeration process.

16. A process for producing a corrosion- and wear-resistant layer on a substrate by thermal spraying, using an iron oxide-based material as set forth in at least one of claims 1 through 15, characterised in that

application of the layer from the material is monitored by an on-line monitoring and control system.

17. A process as set forth in claim 16 characterised by an on-line controlled flame spraying process, in particular a high-speed flame spraying process, as the coating process.

18. A process as set forth in claims 1 through 16 characterised by an on-line controlled flame spraying process, in particular by plasma spraying in air or vacuum, a high-power plasma spraying process (HPPS), a shroud plasma spraying process (SPS), as the coating process.

19. A process as set forth in claim 16 characterised by an on-line controlled wire flame spraying process or an on-line controlled arc wire spraying process as the coating process.

20. A process as set forth in one of claims 16 through 19 characterised by on-line monitoring and control by means of an ITG-camera (18) directed on to the spray jet (10), an LDA-detector (20) with LDA-laser (22) and an HSP-head (24) (Figure 1).

21. A process as set forth in one of claims 16 through 19 characterised by on-line monitoring and control by measurement of the particle speed in the spray flame.

22. A process as set forth in one of claims 16 through 19 or 21 characterised by on-line monitoring and control by means of measurement of the particle speed in the spray flame by a laser Doppler anemometer by means of a beam (60) which is emitted from a laser device (62) and which is divided into two partial beams (60_a, 60_b) by an optical transmission system (64) (Figure 6).

23. A process as set forth in one of claims 16 through 19 characterised by on-line monitoring and control by measurement of the particle speed in the spray flame by means of a high-speed pyrometer.

24. A process as set forth in one of claims 16 through 19 or 23 characterised by on-line monitoring and control in which the particle temperature in the spray flame is measured by means of infra-red thermography (Figure 3).

25. A process as set forth in one of claims 16 through 19 characterised by on-line monitoring and control in which the measured amount of gas is analysed.

26. A process as set forth in one of claims 16 through 19 characterised by on-line monitoring and control in which a measured amount of plasma gas is analysed.

27. A process as set forth in one of claims 16 through 19 characterised by on-line monitoring and control in which a measured current-voltage characteristic is evaluated.

28. A process as set forth in one of claims 16 through 19 characterised by on-line monitoring and control in which an amount of powder fed to the spray flame is measured.

29. A process for producing a corrosion- and wear-resistant layer as set forth in one of claims 17 through 28 characterised in that an on-line controlled plasma spray process which uses air as the plasma gas is used as the coating process.

30. A process for producing a corrosion- and wear-resistant layer as set forth in one of claims 17 through 28 characterised in that an on-line controlled, water-stabilised plasma spray process is used as the coating process.